Claims

What is claimed is:

1. In a disc drive having a data storage disc, an actuator for positioning a transducer over the data storage disc, a servo controller for positioning of the actuator for accessing data sectors in tracks on the data storage disc, an interface controller for communicating with a host computer, and a memory controller and buffer for caching incoming write commands, a method for maintaining the write commands cached in the memory buffer in the event of a power loss, comprising steps of:

(a) detecting a standard drive power loss;

(b) switching from standard drive power to an alternate drive power source;

(c) switching the memory controller into a low-power consumption mode; and

(d) refreshing the write commands in the buffer.

2. The method according to claim 1 further comprising steps of:

(e) detecting a recovery of standard drive power;

(f) switching from the alternate drive power source to the standard drive power;

(g) switching the memory controller into a normal operation mode; and

(h) executing any pending write commands cached in the memory buffer.

3. The method according to claim 2 wherein the write commands cached in the memory buffer further comprise priming data comprising:

a Boolean commit status bit indicating whether a write command has been executed or not;

a Logical Block Address (LBA) of the write command;

a transfer length of the write command; and

a 7-bit counter associated with the LBA of the write command indicating the most recent data associated with the LBA, wherein the 7-bit counter is incremented each time a write command with a duplicate LBA is cached in the memory buffer.

4. The method according to claim 3 wherein the disc drive returns command complete status for a write cached command after the command and priming data have been cached in the memory buffer.

5. The method according to claim 4 wherein the commit bit associated with a write command cached in the memory buffer is set when the write command is executed, and a cache segment in the buffer memory which contained the write command is released.

6. The method according to claim 5 wherein the executing step (h) comprises substeps:

(h) (i) interpreting LBA counters and commit bits associated with write commands cached in the memory buffer;

(h) (ii) executing uncommitted write commands cached in the memory buffer;

(h) (iii) returning drive ready status to the host computer;

(h) (iv) notifying the host computer of a power loss recovery sequence.

7. The method according to claim 5 wherein the executing step (h) comprises substeps:

(h)(i) interpreting LBA counters and commit bits associated with write commands cached in the memory buffer;

(h) (ii) loading uncommitted write commands in the memory buffer into a command queue;

(h) (iii) returning drive ready status to the host computer; and

(h) (iv) notifying the host computer of a power loss recovery sequence.

8. A disc drive having a data storage disc, an actuator for positioning a transducer over the data storage disc, a servo controller for positioning of the actuator for accessing data sectors in tracks on the data storage disc, an interface controller for communicating with a host computer, and a memory controller and buffer for caching incoming write commands,
the disc drive comprising:

a non-volatile write cache using an alternate power source to maintain integrity of data stored in the buffer in the event of a standard drive power loss.

9. The disc drive according to claim 8 wherein the non-volatile write cache comprises:
an alternate power source;

a power control circuit to switch power supplied to the memory controller and buffer between standard drive power and an alternate power source.

10. The disc drive according to claim 9 wherein the memory controller and buffer can operate in a low-power consumption mode.

11. The disc drive according to claim 10 wherein the power control circuit and memory controller can switch to the alternate power source according to the status of a system reset of the disc drive.

12. The disc drive according to claim 11 wherein the alternate power source is a battery located on the disc drive.

13. The disc drive according to claim 11 wherein the alternate power source is a battery located external to the disc drive.

14. The disc drive according to claim 11 wherein the alternate power source includes a capacitor located on the disc drive.

15. The disc drive according to claim 11 wherein the alternate power source includes a capacitor located external to the disc drive.

16. The disc drive according to claim 9 wherein the power control circuit is a multiplexer.

17. The disc drive according to claim 8 wherein the memory controller is integrated in the interface controller.

18. The disc drive according to claim 8 wherein the memory controller is external to the interface controller.

19. A disc drive having a data storage disc, an actuator for positioning a transducer over the data storage disc, a servo controller for positioning of the actuator for accessing data sectors in tracks on the data storage disc, an interface controller for communicating with a host computer, and a memory controller and buffer for caching incoming write commands,

the disc drive comprising:

means for executing cached write commands after a power loss.

20. The disc drive according to claim 19 wherein the means for executing cached write commands comprises:

an alternate power source;

a power control circuit to switch power supplied to the memory controller and buffer between standard drive power and an alternate power source.

21. The disc drive according to claim 20 wherein the alternate power source is a battery located on the disc drive.

22. The disc drive according to claim 20 wherein the alternate power source is a capacitor located on the disc drive.

23. The disc drive according to claim 20 wherein the memory controller is integrated in the interface controller.

24. The disc drive according to claim 20 wherein the memory controller is external to the interface controller.